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Patent Abstracts of Japan

PUBLICATION NUMBER : 2001204549
PUBLICATION DATE : 31-07-01

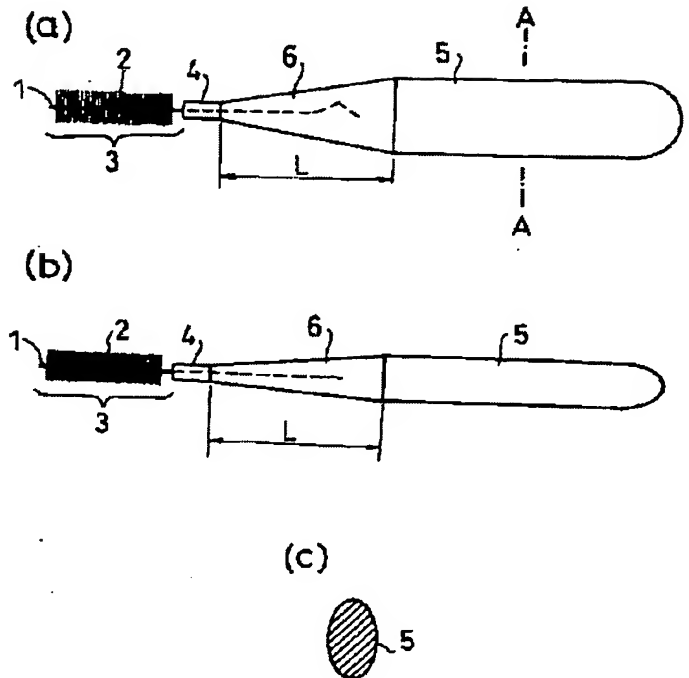
APPLICATION DATE : 25-01-00
APPLICATION NUMBER : 2000015252

APPLICANT : LION CORP;

INVENTOR : ITO TATSU;

INT.CL. : A46B 5/02

TITLE : INTERDENTAL BRUSH



ABSTRACT : **PROBLEM TO BE SOLVED:** To provide an interdental brush of the straight type being easy to grip by fingers, excellent in operability, resistant to bending, and excellent also in durability.

SOLUTION: The interdental brush has a brush part 3 with short bristles 2 passed around a wire 1 and twisted, and the root part of the wire 1 is buried in the end of a straight type handle part made of a resin and is integrally molded therewith. The end of the handle part 5 is tapered to become smaller in diameter toward the brush part 3. A wire reinforcing part 4 of a predetermined length covering the root part of the wire is formed integrally with the end of the tapered part 6. The handle part 5 has an elliptical cross-sectional shape. The length of the tapered part 6 connecting the wire reinforcing part 4 with the end of the handle part 5 is 15 to 30 mm. Further, at least the wire reinforcing part 4 is molded using a polyethylene or polypropylene resin having a flexural elastic modulus of 200 to 700 MPa.

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PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2001-204549

(43)Date of publication of application : 31.07.2001

(51)Int.Cl.

A46B 5/02

(21)Application number : 2000-015252

(71)Applicant : LION CORP

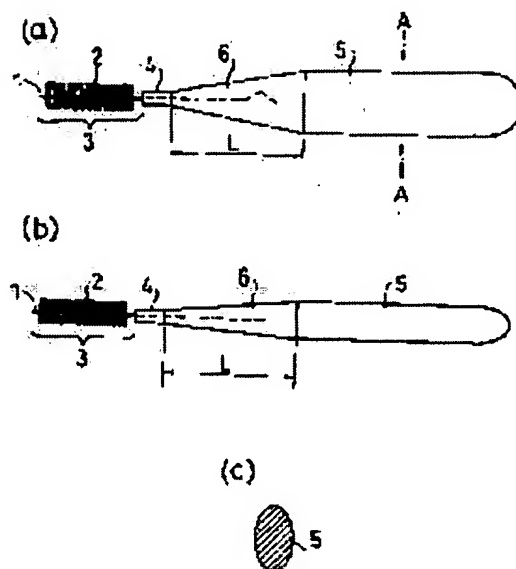
(22)Date of filing : 25.01.2000

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(54) INTERDENTAL BRUSH**(57)Abstract:**

PROBLEM TO BE SOLVED: To provide an interdental brush of the straight type being easy to grip by fingers, excellent in operability, resistant to bending, and excellent also in durability.

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**LEGAL STATUS**

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

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CLAIMS

[Claim(s)]

[Claim 1] It is the interdendum brush which was equipped with the brush section which twisted and transplanted hair on both sides of staple fiber hair on the wire, laid root Motobe of said wire underground at the tip of the grasping section of the straight type which becomes a product made of resin, and was really fabricated. While forming the tip of said grasping section in the shape of [in which the path narrows toward the brush section] a taper The interdendum brush characterized by making the cross-section configuration of said grasping section into an ellipse form in the interdendum brush which really fabricated the wire reinforcement section which consists wire root Motobe of wrap predetermined die length at the tip of this taper section.

[Claim 2] The interdendum brush according to claim 1 characterized by setting to 15-30mm the die length of the taper section which connects said wire reinforcement section and a grasping section tip.

[Claim 3] The interdendum brush according to claim 1 or 2 characterized by fabricating said wire reinforcement section using the polyethylene or polypropylene resin of bending modulus-of-elasticity 200-700MPa at least.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] Especially this invention relates to the interdendum brush excellent in both

operability and endurance about the interdendum brush of a portable straight type.

[0002]

[Description of the Prior Art] It has the brush section which put the filament, twisted and transplanted hair between the metal wires folded in half conventionally, and the interdendum brush of the straight type which embedded root Motobe of this wire at the tip of the grasping section made of resin which becomes rod-like, and really fabricated him is known widely.

[0003] Moreover, in order that it may bend to root Motobe of a wire and the force may act repeatedly, a wire tends to break near root Motobe of a wire. Therefore, near the connection boundary of wire root Motobe and the grasping section is covered in the wire reinforcement section made of resin covering predetermined width of face, it really fabricates, and reinforcing so that a wire may not break with root Motobe is also known (JP,61-180014,U, JP,6-33853,Y).

[0004] Furthermore, at the time of use, the cap which has protected the brush section is inserted in the back end section of the grasping section, and what extended the overall length of the grasping section is known (the utility model registration No. 2510593 official report).

[0005]

[Problem(s) to be Solved by the Invention] However, in the case of the above-mentioned conventional interdendum brush, there were the following problems. That is, since the configuration of the grasping section which it holds and has with a finger was a cylindrical shape or a cylindrical shape, the interdendum brush of the conventional straight type could not fit a finger easily at the time of use, and it is unstable and it was hard to operate it. Since what is necessary was just to still have carried out straight insertion as it was when brushing of the interdendum section of an anterior tooth was carried out, it was so much satisfactory, but after changing the sense of bending and a brush, when the brush section is inserted in the interdendum section of a molar, after being hard to apply a brush section tip to the interdendum section and inserting it in it exactly in the wire reinforcement section, it was hard to carry out actuation moved forward and backward.

[0006] Moreover, although the interdendum brush of the conventional straight type had connected between the wire reinforcement sections and the grasping section tips which were mentioned above in the taper section, since the die length of this taper part is short, when using it for the interdendum section of a molar, looking at a mirror, the size of the grasping section becomes obstructive, and the interdendum section stops being able to be visible easily, and it tended to bar actuation.

[0007] Furthermore, by being hard coming to use at the time of use, if the resin of the wire reinforcement section was too soft, since immobilization of the brush section would become unstable, when too hard, a wire becomes easy to break in the tip location of the reinforcement section, and there was fault that the reinforcement effectiveness became weak, conversely.

[0008] This invention was made in order to solve the above problems, it is easy to grasp it with a finger, it is excellent in operability, cannot break easily, and aims at offering the interdendum brush of the straight type excellent also in endurance.

[0009]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the interdendum brush of this invention It is the interdendum brush which was equipped with the brush section which twisted and transplanted hair on both sides of staple fiber hair on the wire, laid root Motobe of said wire underground at the tip of the grasping section of the straight type which becomes a product made of resin, and was really fabricated. While forming the tip of said grasping section in the shape of [in which the path narrows toward the brush section] a taper, in the interdendum brush which really fabricated the wire reinforcement section which consists wire root Motobe of wrap predetermined die length at the tip of this taper section, the cross-section configuration of said grasping section is made into an ellipse form.

[0010] By considering as such a configuration, the difficulty of having of the grasping section of the conventional cylindrical shape or a cylindrical shape is solvable. That is, when the cross-section

configuration of the grasping section is made into an ellipse form, in case the grasping section is held and held with a finger, a finger is fitted well, and it becomes easy to hold. Even when bending the wire reinforcement section and carrying out brushing of the interdendum of a molar by this, it can hit against the interdendum section of a molar (especially molar of a lingual side) exactly. Moreover, since an interdendum brush can be held firmly, it inserts, and becomes easy to move forward and backward, and interdendum cleaning becomes easy.

[0011] Furthermore, it becomes 15–30mm, then a more desirable thing about the die length of the taper section which connects said wire reinforcement section and a grasping section tip. Operability improves without it seeming that the size of the grasping section becomes obstructive and disappears even when using it for the interdendum section of a molar, looking at a mirror, while such a configuration, then the brush section become easy to reach the interdendum of a molar.

[0012] Moreover, it is more desirable if said wire reinforcement section is fabricated using the polyethylene or polypropylene resin of bending modulus-of-elasticity 200–700MPa at least. When the wire reinforcement section is constituted using the resin of such a bending modulus of elasticity, while the brush section bending-comes to be easy in a wire reinforcement section location, the endurance of the wire to repeat use improves.

[0013]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained with reference to a drawing. The gestalt of operation of the 1st of the interdendum brush applied to this invention at drawing 1 and drawing 2 is shown. Drawing 1 (a) is the side elevation of an interdendum brush, and a top view in the condition that in drawing 1 (b) a top view and drawing 1 (c) bent the brush section with the A–A line sectional view in drawing 1 (a), and drawing 2 bent it in the wire reinforcement section location.

[0014] The brush section 3 which the interdendum brush of the example of illustration twisted the staple fiber hair 2 by twisting a wire 1 after putting the staple fiber hair 2 which consists of a filament made of synthetic resin between the metal wires 1 used as 2 chip boxes, and transplanted hair, The wire reinforcement section 4 which really consists root Motobe of a wire 1 of polyethylene or polypropylene resin with shaping. It consists of the taper sections 6 which connect between the grasping section 5 for holding and holding with a finger at the time of interdendum cleaning, and the tips of this grasping section 5 and the wire reinforcement sections 4. Root Motobe of the wire 1 which constitutes the brush section 3 is extended in the taper section 6 through the wire reinforcement section 4, and is really embedded by shaping. The configuration described above becomes the same configuration as a well-known interdendum brush conventionally.

[0015] As shown in drawing 1 (c), while the interdendum brush concerning the gestalt of the 1st operation makes an ellipse form the cross-section configuration of said grasping section 5 in the interdendum brush which becomes the above-mentioned configuration Die-length L of the taper section 6 is set to 15–30mm, and the polyethylene or polypropylene resin of bending modulus-of-elasticity 200–700MPa is further used as a resin ingredient which constitutes the wire reinforcement section 4, the taper section 6, and the grasping section 5.

[0016] The dimension of the ellipse form cross section of the grasping section 5 was made into the ellipse form of the major axis of 10mm, and 6mm of minor axes in drawing 1 (c). Moreover, the brush section 3 put the staple fiber hair 2 which uses this wire as 2 chip boxes using a wire with a diameter [made from stainless steel (SUS304)] of 0.3mm as a wire 1, and consists of a nylon filament of 0.076mm of sizes (3 mils) between them, and after it twisted the wire 1 and was fixed, it constituted it by cutting the staple fiber hair 2 to an even length to predetermined hair length. The hair transplantation width of face in alignment with the wire longitudinal direction of the staple fiber hair 2 is about 10mm.

[0017] Bending, in case it becomes empty and inserts in the narrow interdendum section, in order to make it the size of the wire reinforcement section 4 not bar brushing, as for the wire reinforcement section 4, it is desirable to consider as the diameter of 2mm or less. In the case of the example of

illustration, the size of the wire reinforcement section 4 set it as the diameter of 1.6mm, and die length was set to 4.0mm.

[0018] In order that the brush section 3 may make it easy to reach the interdendum section of a molar, as for die-length L of the taper section 6, it is desirable to consider as die length of at least 15mm or more, but if too long, since fault may be conversely produced as portable, it is good to consider as the range of 15–30mm, as mentioned above. In the case of the example of illustration, as die length convenient to carry, the interdendum brush overall length from the tip of the brush section 3 to the end of the grasping section 5 was set to about 60mm, and die-length L of the taper section 6 was set to 16mm. In addition, when considering as the interdendum brush of a portable short straight type, as for the die length of the grasping section 5, it is desirable to consider as the range of 20–40mm.

[0019] In addition, as shown in drawing 1 (a), the back end part of the wire 1 to lay underground is beforehand bent in the shape of [of “**”] a character, and is made as [escape / simply]. Moreover, since the taper section 6 is fully long compared with the conventional interdendum brush in the case of the interdendum brush of this invention, the embedding distance of extent which arrives in the taper section 6 so that it is not necessary to embed the end of a wire 1 so long that it arrive at the location of the grasping section 5 and it may be illustrated is enough.

[0020] As a resin material which constitutes the grasping section 5, the taper section 6, and the wire reinforcement section 4, it inquired in consideration of the wire reinforcement function by the wire reinforcement section 4. Consequently, when it bent, it became clear that polyethylene or polypropylene resin with the hinge effectiveness is desirable. Moreover, if the wire reinforcement section 4 needs to stabilize and fix the wire also during interdendum brush use and its bending modulus of elasticity of resin is too small, the brush section 3 will not be stabilized by it but it will produce fault in actuation. According to the experiment, it became clear that the resin of the elastic modulus of at least 200 or more MPas is desirable.

[0021] Namely, in order to return with rubber elasticity and the property of creep recovery after bending the wire reinforcement section 4 if it fabricates with too soft polyethylene or polypropylene resin, Although it will be easy to maintain at the condition of having bent the wire reinforcement section 4 if it is hard coming to use and fabricates with too hard polyethylene or polypropylene resin conversely, since the resiliency of resin is scarce, Only a wire 1 bends in the location outside the wire reinforcement section 4 while in use within the oral cavity in many cases, it becomes easy to break with this section, and the reinforcement effectiveness of a wire becomes weak.

[0022] Then, this invention person found out that the polyethylene or polypropylene resin of bending modulus-of-elasticity 200–700MPa was desirable as suitable resin as mentioned above, as a result of taking these points into consideration and repeating an experiment. In addition, in the case of the interdendum brush concerning the gestalt of illustration implementation, the polyethylene resin of bending modulus-of-elasticity 300MPa was used.

[0023] Since the cross-section configuration of the grasping section 5 is made into the ellipse form in the case of the interdendum brush of the gestalt of the 1st operation, in case [in which it becomes the above-mentioned configuration] the grasping section 5 is held and held with a finger, a finger is fitted well, and it becomes easy to hold. Even when bending the brush section 3 in the location of the wire reinforcement section 4 and carrying out brushing of the interdendum of a molar by this, it can hit against the interdendum section of a molar (molar of especially the bottom) exactly. Moreover, since maintenance is possible firmly, it inserts, and becomes easy to move forward and backward, and cleaning of the interdendum section becomes easy.

[0024] Moreover, since the die length of the taper section 6 which connects the wire reinforcement section 4 and the grasping section 5 is set to 15–30mm, while the brush section 3 becomes easy to reach the interdendum of a molar, even in case it is used for the interdendum section of a molar, looking at a mirror, it becomes without it seeming that the size of the grasping section becomes obstructive and disappears, and operability improves.

[0025] Moreover, while it is [the brush section 3] bending-easy and becoming in the location of the wire reinforcement section 4 as shown in drawing 2 since the wire reinforcement section 4 is really fabricated using the polyethylene or polypropylene resin of modulus-of-elasticity 200-700MPa, the endurance of the wire 1 to repeat use also improves.

[0026] The gestalt of operation of the 2nd of the interdendum brush applied to this invention at drawing 3 is shown. For the side elevation of an interdendum brush, and drawing 3 (b), a top view and drawing 3 (c) are [drawing 3 (a) / the C-C line sectional view in drawing 3 (a) and drawing 3 (e) of the B-B line sectional view in drawing 3 (a) and drawing 3 (d)] D-D line sectional views in drawing 3 (a).

[0027] The gestalt of this 2nd operation changes the configuration of the grasping section 5 in the interdendum brush which becomes the same structure as the gestalt of said 1st operation. That is, the grasping section 5 is made further easy to have by both forming the small neck 7 in the center section, supposing it forms the whole grasping section 5 in a cross-section ellipse form. When the example of a dimension of the size of each part of the grasping section 5 is given, they are the ellipse form where the maximum size parts (B-B and the D-D part in drawing 3 (a)) are the major axis of 7.5mm, and 6mm of minor axes, and the ellipse form where the minimum size parts (C-C part in drawing 3 (a)) are the major axis of 6mm, and 4.5mm of minor axes.

[0028] Thus, when it considers as the grasping section 5 equipped with the neck 7, the fit nature to the finger when holding and having the grasping section 5 with a finger can be raised further, and operability can be improved more.

[0029] In addition, although the case where it formed in the ellipse form which was mentioned above and which was equipped with the whole grasping section 5 configuration with the gestalt of the 1st operation, and equipped the ellipse form of the same cross section with the neck 7 in the center section of the grasping section 5 with the gestalt of the 2nd operation was illustrated, the whole grasping section 5 configuration is not restricted to these, and the cross-section configuration of each part of the grasping section 5 should just be made into the ellipse form.

[0030]

[Example] The interdendum brush concerning the gestalt of the 1st operation shown in drawing 1 was made as an experiment, and the use test was actually carried out using this prototype. Consequently, the fit nature to the finger of the grasping section was better than the interdendum brush of the conventional cylindrical grasping section, and it was checked that it is easy to have. Moreover, since the taper section 6 was ** length when it is used for the interdendum section of a molar after bending the brush section 3 in the wire reinforcement section 4 as shown in drawing 2 , it was checked that it is [brushing-] easy to make it easy for the amount of [of the grasping section 5] point not to interfere with a field of view, and for the tip of the brush section 3 to reach a molar well, and to insert.

[0031] The interdendum brush concerning the gestalt of the 2nd operation shown in drawing 3 was made as an experiment, and the use test was actually carried out using this prototype. Consequently, since a neck 7 existed, the fit nature to a finger improved further rather than the interdendum brush of the gestalt of implementation of the above 1st, and it was checked that operability is also still better.

[0032]

[Effect of the Invention] According to the interdendum brush of this invention, since the cross-section configuration of the grasping section is made into the ellipse form, when it holds and has the grasping section with a finger, a finger is fitted well, further, it can stabilize and hold, without an interdendum brush rotating at the time of use, and operability improves.

[0033] Moreover, since the die length of the taper section which connects between the wire reinforcement section and the grasping sections is set to 15-30mm and the taper section is made long and slender compared with the conventional interdendum brush, it becomes without it seeming that the size of the grasping section becomes obstructive and disappears even when using it for the

interdentium section of a molar, looking at a mirror, the brush section becomes easy to reach the interdentium section of a molar, and operability improves.

[0034] Furthermore, since the wire reinforcement section was fabricated at least with the polyethylene or polypropylene resin of bending modulus-of-elasticity 200–700MPa, it is lost that a wire breaks with the tip side of the wire reinforcement section, and the reinforcement effectiveness over a wire can be heightened. Moreover, it becomes impossible that it is bending-easy of the brush section in the wire reinforcement section, and operability can be improved further.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The gestalt of the 1st operation is shown, (a) is a side elevation and the (b) top view, and (c) is an A-A line sectional view in (a).

[Drawing 2] It is the top view of the interdentium brush in the condition of having bent the brush section in the wire reinforcement section location.

[Drawing 3] The gestalt of the 2nd operation is shown and, for a side elevation and (b), a top view and (c) are [(a) / the C-C line sectional view in (a) and (e of the B-B line sectional view in (a) and (d))] D-D line sectional views in (a).

[Description of Notations]

1 Wire

2 Staple Fiber Hair

3 Brush Section

4 Wire Reinforcement Section

5 Grasping Section

6 Taper Section

7 Neck

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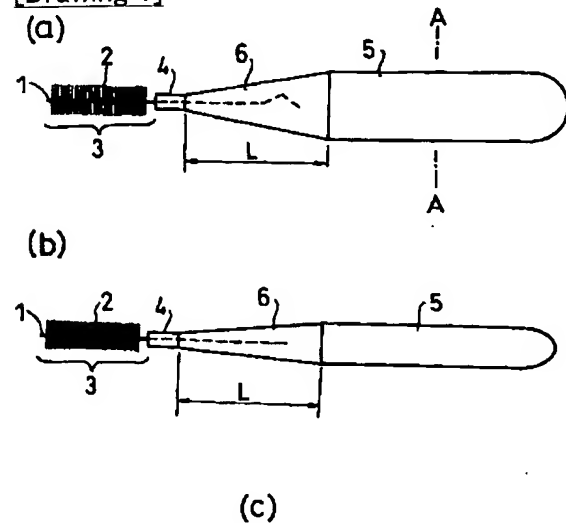
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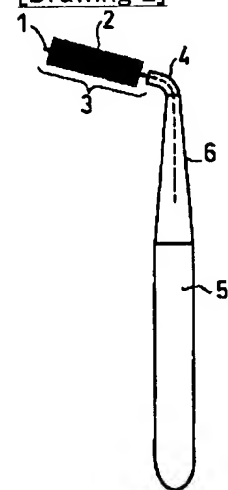
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DRAWINGS

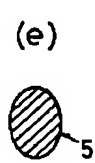
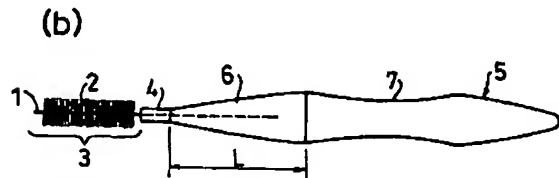
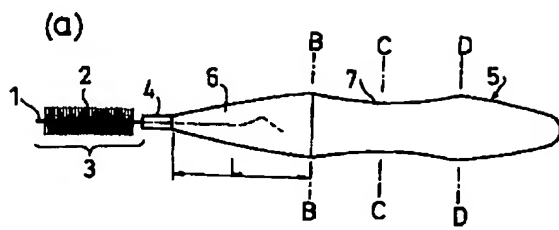
[Drawing 1]



[Drawing 2]



[Drawing 3]



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